Kentucky Department of Education **KY-2A**
2001

Program Description/Textbook or Print Instructional Material

Vendor: McDougal Littell Inc. (A Houghton Mifflin Co.) Web Address: www.mcdougallittell.com

Title: Chemistry, 5th Edition

Author: Steven S. Zumdahl Copyright: 2000

ISBN: 0-618-03591-5 Course/Content Area: Chemistry

Intended Grade or Level 9-12 Readability Level: 8.86 (Dale-Chall)

List Price: 119.16 Lowest Wholesale Price: 89.37

FEATURES*

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Content

Chemistry will help students understand that chemistry is fundamentally concerned with how one substance changes to another –how plants grow by absorbing water and carbon dioxide, how humans manufacture the proteins from the foods consumed, how smog forms in areas with traffic congestion, how nylon for jackets is made, etc.
The content is presented with discussions, illustrations, and exercises to give students more accurate pictures of the fundamental ideas of chemistry.

The microscopic world of chemistry is presented so students have a picture in their minds of "what the atoms and molecules are doing." There is a strong emphasis on the qualitative understanding of concepts before quantitative problems are considered. The text has a thorough treatment of reactions that occur in solution, including acid-base reactions. Descriptive chemistry and chemical principles are thoroughly integrated in the text.

Student Experiences

The authors believe that students learn best when they are involved in the process of chemistry, and that active learning promotes student responsibility. The Chemical Impact features emphasize practical application of newly learned concepts on such topics as alternative fuels, night vision technology, and microchip laboratories.
For example, the Chemical Impact "Refurbishing the Lady" illustrates the chemistry behind the restoration of the Statue of Liberty, while "Nature Has Hot Plants" discusses several fascinating species of heat-producing plants.
The text has a strong problem-solving orientation that talks to the student about how to approach and solve chemical problems, using a thoughtful and logical approach rather than simply memorizing procedures.
Throughout the text, there is a strong emphasis on models. Coverage includes how they are constructed, how they are tested, and what students learn when they inevitably fail. The modeling stresses the limitations and uses of models/theories to allow students to see how scientists think and work. Rather than present one theory as "truth," then later on tell students it was not completely accurate, the text acknowledges from the start that any model has limits.

Assessment

The text contains almost 300 sample exercises, with many more examples used to illustrate general strategies.
When a specific strategy is presented, it is summarized and the sample exercise that follows it reinforces the step-by-step attack on the problem.
End-of-chapter problems include the following: In-Class Discussion Questions to test students' conceptual grasp of the material; Questions to help review important facts; Exercises that are paired and organized by topic; Challenge

Problems, which require students to combine skills and problems; and Marathon Problems, which are the most comprehensive and challenging type of problem.

The Test Item File has more than 2000 exam questions in multiple-choice, open-ended, and true-false formats. The Computerized Testing (Macintosh and Windows) presents the Test Item File so teachers can produce chapter tests, midterms, and final exams easily and with excellent graphics capability. The teacher can edit existing questions and add new ones as desired, or preview questions on screen and add them to the test with a single keystroke.

Organization

Each of the 23 chapters begins with a full-page photograph tied to the chapter material and an introduction that demonstrates how chemistry is related to everyday life. The Chemical Impact boxes describe current applications of chemistry with topics such as automatic sunglasses, paint that stops rust, self-destructing paper, and golfing with glass. Important rules and steps appear in colored boxes so students can locate them easily. For most concepts, illustrations and photos help students visualize what is going on. To further help students visualize concepts by using animation, videos, and molecular models, a CD-ROM, General Chemistry, Interactive, has been packaged with the text. Blue CD icons in the text margin signal that there is companion material available on the CD-ROM.

Throughout the text, margin notes highlight key points, comment on an application of the text material, or reference material in other parts of the book. Each chapter has a narrative summary, which re-explains key concepts, and a key terms list for review. The questions at the end of the chapter reinforce conceptual understanding, review key concepts, combine skills from more than one topic, and combine multiple concepts in complex problems. The answers to exercises denoted by blue question numbers are in the back of the book. The goal of these exercises is not simply to get the correct answer but to understand the process for getting the answer. The six appendices provide optional material for the teacher on, for example, mathematical procedures, the quantitative kinetic molecular model, spectral analysis, and selected thermodynamic data.

Resource Materials

?? **Gratis Items To Be Provided And Under What Conditions**
Free Per Classroom Teacher: Instructor's Annotated Edition with CD-ROM, *Experimental Chemistry* Laboratory Manual, Instructor's Resource Guide for *Experimental Chemistry* Laboratory Manual, Study Guide, Complete Solutions Guide, Instructor's Resource Guide, Test Item File, Lecture Demonstration Resource Guide, Test Generator Windows/Macintosh, Power Presentations Manager CD-ROM, Overhead Transparencies, PowerPoint Slides CD-ROM

?? **Available Ancillary Materials**
Partial Solutions Guide, CD-ROM General Chemistry: Interactive Software Version 4.0

RESEARCH DATA/EVIDENCE OF EFFECTIVENESS**

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Zumdahl's *Chemistry* has been the most widely used textbook in high school Advanced Placement courses throughout five successive editions, having been used by thousands of teachers and tens of thousands of students for the past two decades. The text is listed among those texts found to be suitable for Advanced Placement Chemistry by the College Board. Steven S. Zumdahl is one of the most well known and respected names in the field, having won awards both as an undergraduate educator and as an author. His continuing classroom experience, combined with up-to-date research, ensures that the topical coverage and pedagogical features found in this program will prove effective for high school AP students.

***NOTE:** Please complete this section by indicating the research data/evidence of effectiveness or give a web site where the information is located. If there is no research data/evidence of effectiveness, please indicate **"not available"** in the space.*

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Program Description/Textbook or Print Instructional Material

Vendor: McDougal Littell Inc. (A Houghton Mifflin Co.) Web Address: www.mcdougallittell.com

Title: Introductory Chemistry: A Foundation, 4th Edition

Author: Steven S. Zumdahl Copyright: 2000

ISBN: 0-395-95536-X Course/Content Area: Chemistry

Intended Grade or Level 9-12 Readability Level: 7.89 (Dale-Chall)
List Price: 92.76 Lowest Wholesale Price: 69.57

FEATURES*

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Content

The content of *Introductory Chemistry: A Foundation* has been presented to make chemistry interesting, accessible, and understandable to the student. The student should be able to relate the macroscopic world of chemistry – the observation of color changes and precipitate formation – to the microscopic world of ions and molecules. To achieve that, this text has presented concepts in a clear and sensible manner using language and analogies that students can relate to. Chemistry has been connected to real-life experiences at every opportunity, from chapter opening discussions of chemical applications to "Chemistry in Focus" features throughout the book.
The chemical nature of matter is emphasized early in the book and the theoretical intricacies of atoms and orbitals are taught in later chapters. Reactions are inherently interesting to students and can motivate them to study chemistry. In particular, reactions can form the basis for fascinating classroom demonstrations and laboratory experiments.

Student Experiences

Because problem solving is a high priority in chemical education, the development of such skills is a central focus of this textbook. In the first chapters, considerable time is spent guiding students to an understanding of the importance of learning chemistry and how learning to think like a chemist is beneficial in any profession. To emphasize this idea, scientific thinking is applied to real-life problems in Chapter 1.
Careful attention has been paid to fundamental mathematical skills as using scientific notation, rounding off to the correct number of significant figures, and rearranging equations to solve for a particular quantity.
The idea that students need a systematic, thoughtful approach to problem solving is fostered throughout the text. Students are encouraged to represent the essence of the problem using symbols and/or diagrams, and end with thinking about whether the answer makes sense.
To make the text "student friendly," the authors have presented a systematic and thorough treatment of chemical nomenclature. Once this framework is established, students can progress through the book more comfortably.
Along with chemical reactions, applications form an important part of descriptive chemistry. Because students are interested in chemistry's impact on their lives, the "Chemistry in Focus" boxes describe current applications of chemistry on such topics as artificial sweeteners, foaming chewing gum, fake fats, and the greenhouse effect.
Photos included in the text illustrate a chemical reaction or phenomenon or make a connection between chemistry and the real world.

Assessment

Student self-assessment begins with the Self-Check Exercises, which follow the Examples. These exercises allow students to practice the skills they have just learned. There are cross-references to similar end-of-chapter exercises.

At the end of each chapter, in-class discussion questions will allow students to assess their knowledge of particular topics. The Questions and Problems are keyed to chapter sections, the Additional Problems incorporate material from more than one section, and the Cumulative Reviews contain material from two or three chapters. Each of these sets of questions allows students to assess their understanding of a topic. The Test Item File contains over 1600 multiple-choice, true-false, short-answer, matching, and completion questions. The Computerized Test Item File (Macintosh and Windows) is an electronic version of the print Test Item File.

Organization

Each of the twenty chapters has a chapter opener that includes an application photograph tied to the chapter material and a chapter outline that gives the student an overview of the topics to be studied. The chapter, then, begins with an introduction that demonstrates how chemistry is related to everyday life. Aim statements accompany each numbered section and provide learning objectives for students. The Chemistry in Focus boxes describe current applications of chemistry on such topics as fat substitutes, the ozone layer, the chemistry of snacks, and alternative fuels. Important rules and steps appear in colored boxes so students can locate them easily. Key terms are printed in bold type and are defined within the chapter where they first appear. They are also grouped at the end of the chapter and in the Index/Glossary at the back of the text. Each chapter has a Summary section to reinforce key concepts and several types of questions and problems.

Many examples, titled for easy reference, are located throughout the text. They model a thoughtful, step-by-step approach to solving problems. Most examples are followed by Self-Check Exercises, which provide students opportunities to practice the just-learned skills. Some of the more common elements are highlighted in Periodic Table Icons to remind students about the position of selected elements and to help them become more familiar with the periodic table. The illustrations and photos provide visual representation of chemical reactions, phenomena, and processes to help students understand chemistry.

Resource Materials

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Free Per Classroom Teacher: Instructor's Annotated Edition, Introductory Chemistry in the Laboratory, Instructor's Guide for Introductory Chemistry in the Laboratory, Study Guide, Complete Solutions Guide, Test Bank, Power Presentations Manager CD-ROM, Overhead Transparencies, PowerPoint Slides CD-ROM
Free Per Classroom Teacher, Choice of One of the Following:
Test Generator Windows, Test Generator Macintosh

?? **Available Ancillary Materials**
Solutions Guide, Introductory Chemistry Interactive CD-ROM

RESEARCH DATA/EVIDENCE OF EFFECTIVENESS**

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